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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/809,916	03/26/2004	Toshihiro Kinoshita	50024-031	6747
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EXAMINER MIDKIFF, ANASTASIA				
ART UNIT 2882		PAPER NUMBER		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/809,916

Applicant(s)

KINOSHITA, TOSHIHIRO

Examiner

ANASTASIA MIDKIFF

Art Unit

2882

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 December 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 10-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 10-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 21 December 2007 has been entered.

Claim Rejections - 35 USC § 103

Claims 1, 2, and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication to Bazan et al. (US 2004/0142206 A1), and in view of article to Yu, et al. (15 February 2001).

With respect to Claims 1 and 2, Bazan et al. teach an organic electroluminescent device (Abstract) comprising:

- a hole injection electrode (31);
- a hole injection layer (32, 33);
- a light emitting layer (34) ; and
- an electron injection electrode (37) in this order, wherein:
 - said hole injection layer (32, 33) includes a first hole injection layer (32) and a second hole injection layer (33), said second layer of the hole injection layer being a hole transporting layer (33);

- said first hole injection layer (32) having a property of absorbing not less than 10% of ultraviolet light having a wavelength shorter than 380 nm, and including a phthalocyanine-based compound with a metal center (Paragraph 51);
- said second hole injection layer (33) including a fluorocarbon (Paragraphs 45-46).

Bazan et al. do not specifically teach copper as the metal within the complex.

Yu teaches copper phthalocyanine (CuPc) as the hole-injection layer in an organic electroluminescent device, wherein the CuPc enhances the injection of holes in the layer (Abstract, Page 2343 Column 1 Lines 11-14, and Page 2347 Column 1 Line 14).

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ copper, as suggested by Yu, as the metal in the phthalocyanine compound of Bazan et al., to take advantage of the hole injection enhancing properties of CuPc, thereby achieving high electroluminescence performance with lower driving voltage necessary and higher efficiency in the device.

With respect to Claims 10-12, Bazan et al. further teach that:

- said first hole injection layer (32) has a thickness greater than 5 nm and smaller than 15 nm (Paragraph 54); and,
- said second hole injection layer has a thickness greater than 0.5 nm (Paragraph 49).

Claims 1, 2, and 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication to Kubota et al. (US 2002/0113241 A1), in view of Yu, et al.

With respect to Claims 1 and 2, Kubota et al. teach an organic electroluminescent device (Paragraphs 99-100) comprising:

- a hole injection electrode (Paragraph 100);
- a hole injection layer (Paragraph 100);
- a light emitting layer (Paragraph 100); and
- an electron injection electrode in this order (Paragraph 100), wherein:
 - said hole injection layer includes a first hole injection layer and a second hole injection layer, referred to as the hole-transport layer (Paragraph 100);
 - said first hole injection layer having a property of absorbing not less than 10% of ultraviolet light having a wavelength shorter than 380 nm, and including a phthalocyanine-based compound (Paragraph 104);
 - said second hole injection layer including a fluorocarbon (Paragraph 146).

Kubota et al. do not specifically teach copper as the metal within the complex.

Yu teaches copper phthalocyanine (CuPc) as the hole-injection layer in an organic electroluminescent device, wherein the CuPc enhances the injection of holes in

the layer (Abstract, Page 2343 Column 1 Lines 11-14, and Page 2347 Column 1 Line 14).

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ copper, as suggested by Yu, as the metal in the phthalocyanine compound of Kubota et al., to take advantage of the hole injection enhancing properties of CuPc, thereby achieving high electroluminescence performance with lower driving voltage necessary and higher efficiency in the device.

With respect to Claims 10-13, Kubota et al. further teach that:

- said first hole injection layer has a thickness greater than 5 nm and less than 15 nm (Paragraph 150, Line 2); and,
- said second hole injection layer has a thickness greater than 0.5 nm and less than 3 nm (Paragraph 150, Line 3).

Claims 1, 2, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication to Sakakura et al. (US 2002/0153831 A1) and in view of Bazan et al.

With respect to Claims 1 and 2, Sakakura et al. teach an organic electroluminescent device (Paragraph 2) comprising:

- a hole injection electrode (Paragraph 105);
- a hole injection layer (Paragraph 105);
- a light emitting layer (Paragraph 105); and
- an electron injection electrode in this order (Paragraph 105), wherein:

- said hole injection layer includes a first hole injection layer and a second hole injection layer, referred to as the hole transport layer (Paragraph 105);
- said first hole injection layer having a property of absorbing not less than 10% of ultraviolet light having a wavelength shorter than 380 nm, and including copper phthalocyanine (Paragraph 106);

Sakakura does not teach said second hole injection layer includes a carbon-based halide fluorocarbon.

Bazan et al. teach a carbon-based halide fluorocarbon of 2,2',7,7'-tetrakis(diphenylamino)-9,9'-spirobifluorene for the second hole injection layer of an electroluminescent device (Paragraphs 45-46), wherein the fluorocarbon is a material preferred for the layer due to its small ionization potential, high transparency to visible rays, high hole mobility, excellent stability, and low occurrence of generating impurities that would serve as a trap during production or use of the device (Paragraphs 45-46).

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ the fluorocarbon material of Bazan et al. in a hole injection layer in the device of Sakakura, to provide a hole-injection layer that has high efficiency due to its material properties, as suggested by Bazan et al. (Paragraphs 45-46).

With respect to Claim 14, Sakakura et al. teach a method of manufacturing an organic electroluminescent device (Abstract) comprising the steps of:

- forming a hole injection layer on a hole injection electrode (944; see Paragraphs 104-105);

- forming a light emitting layer and an electron injection electrode in this order above said hole injection layer (Paragraph 105); and,
- wherein said step of forming said hole injection layer includes the steps of:
 - forming a first hole injection layer made of copper phthalocyanine having a property of absorbing ultraviolet light (Paragraphs 105-106); and,
 - forming a second hole injection layer on said first hole injection layer by plasma chemical vapor deposition (Paragraphs 104-106).

Sakakura does not teach said second hole injection layer includes a carbon-based halide fluorocarbon.

Bazan et al. teach a carbon-based halide fluorocarbon of 2,2',7,7'-tetrakis(diphenylamino)-9,9',-spirobifluorene for the second hole injection layer of an electroluminescent device (Paragraphs 45-46), formed by vapor deposition (Paragraph 48), wherein the fluorocarbon is a material preferred for the layer due to its small ionization potential, high transparency to visible rays, high hole mobility, excellent stability, and low occurrence of generating impurities that would serve as a trap during production or use of the device (Paragraphs 45-46).

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ the fluorocarbon material of Bazan et al. in a hole injection layer in the device of Sakakura, to provide a hole-injection layer that has high efficiency due to its material properties, as suggested by Bazan et al. (Paragraphs 45-46).

Response to Arguments

Applicant's arguments filed 21 December 2007 have been fully considered but they are not persuasive.

With respect to the Bazan reference, the Applicant asserts that Bazan does not teach a fluorocarbon as a second hole injection layer. The examiner respectfully disagrees.

This argument seems to be asserting that the second hole-injection layer of Bazan cannot be part of the hole injecting layer, because it is referred to as a hole-transporting material in the Bazan reference. However, the examiner cannot find any structural or functional limitations in the claimed second hole-injection layer of fluorocarbon that would distinguish the Applicant's fluorocarbon over the fluorocarbon of Bazan. Additionally, the specification states that the second "hole injection layer" need be "capable of promoting the injection of holes and reducing the initial drive voltage" wherein a fluorocarbon - preferably including an amine-based material - will meet this requirement (see Specification, Page 12).

Bazan teaches that a hole-injecting layer (32, 33) comprises a first layer (32) and a second layer (33), wherein said second layer (33) includes a fluorocarbon of 2,2',7,7'-tetrakis(diphenylamino)-9,9',-spirobifluorene (Paragraphs 45-46). Consequently, Bazan is considered to teach a second hole injection layer made of fluorocarbon.

With respect to the prior art rejections of the claims, the Applicant asserts that the invention of the instant application recognized unexpected effects over the prior art, as both initial drive voltage and voltage increase after irradiation are reduced with the use

of both CuPu as the first hole injection layer material and CFx as the second hole injection layer material (see Remarks, Pages 6-7). The examiner respectfully disagrees.

According to the table provided in the Applicant's Specification, and as seen in Applicant's Remarks, Page 6, an reduction in initial drive voltage is expected by using CFx as a hole injection layer material (see comparative example 1), and a reduction in voltage increase after photoirradiation is expected using CuPu as a hole injection layer material (see comparative example 2). Therefore, each material acts as expected, so that the use of *both* materials results in achieving *both* of the voltage reductions expected for each material.

Consequently, this argument is not persuasive.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANASTASIA MIDKIFF whose telephone number is (571)272-5053. The examiner can normally be reached on M-F 7-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on 571-272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2882

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. M./

Examiner, Art Unit 2882

03/06/08

/Edward J Glick/

Supervisory Patent Examiner, Art Unit 2882